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Editor :
PROF. SIR FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E., Dr. Med. Vet. (*h.c.*) Zurich, Hon. Vety. Surgeon to His Majesty the King, Emeritus Professor of Surgery in the Royal Veterinary College.

Sub-Editor :
GLADSTONE MAYALL, M.R.C.V.S.

in collaboration with

PROFESSOR T. DALLING
Professor of Animal Pathology and Director of The Institute of Animal Pathology, Cambridge University.

RICHARD HUDSON
Retford

PROFESSOR J. MCCUNN
Professor of Anatomy, The Royal Veterinary College.

LIEUTENANT-COLONEL T. DUNLOP YOUNG
Veterinary Adviser to various Overseas Governments; late Chief Veterinary Officer to the Corporation of the City of London.

JUNE, 1938

Editorial

THE END OF QUACKERY IN FRANCE

OUR first General Article will prove of immense interest to our readers as being the details of a Parliamentary Bill which is designed to protect not only the members of the veterinary profession but also the public and the animals themselves from the ministrations of the charlatan and the unqualified man. In this respect, if this Bill passes the Higher Chamber, France will stand on a footing with Spain and Norway, the only two countries of Europe which have up till now taken steps to protect those who have spent much time and money in acquiring a scientific veterinary training as well as to protect the sick animal and its owner.

It will be remembered that when the Veterinary Surgeons Act was passed in Great Britain in 1881 it was thought that the door had been closed against unqualified practice, as the term "veterinary surgeon" was restricted to those who alone held the qualifying diploma. It was soon found, however, that there were ways and means by which a road could be found for the

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unqualified person still to doctor the sick animals under some title which avoided the use of the words veterinary surgeon, but still implied that the "pretender" possessed a qualification, and at the present time unfortunately Great Britain has several thousand such persons. It is true that the human branch of Medicine is even worse off than we are, except in respect of legal enactment whereby in the event of death the patients cannot be buried or the body otherwise disposed of without a certificate from a duly qualified medical practitioner.

The dental surgeons some few years ago obtained a new Act of Parliament which prevents the use of the terms "dentist" or "dental surgeon" by other than registered men; the Act is so worded that no unregistered person can do anything in the way of a dental operation.

We congratulate our French colleagues on having taken this step and we hope that the Bill will soon pass the Senate.

General Articles

TRANSLATION OF BILL WHICH PASSED THE FRENCH CHAMBRE DES DÉPUTÉS ON JANUARY 28, 1938

Article 1.—Those persons only are authorised to practise the medicine and surgery of animals who are of French Nationality and possess the State Diploma of Veterinary Surgeon, or the State Diploma of Veterinary Doctor.

Article 2.—Veterinary Surgeons or Veterinary Doctors alone will be called upon by administrative authorities for all acts within their competence.

Article 3.—Every Veterinary Surgeon or Veterinary Doctor desiring to practise his profession must, within a month of setting up in practice, register (gratis) his Diploma at the Prefecture of his province and at the registry of the civil tribunal of his district. If he removes his residence to another province, he must renew his registration within a month.

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Article 4.—Each year in each departement a list shall be set up bearing the names, residence, date and source of Diploma of the Veterinary Surgeons or Veterinary Doctors referred to in this Act. This list will be posted in every commune of the province.

Article 5.—Any person who is not qualified as stated in Article 1 who shall habitually, with or without remuneration, practise the medicine or surgery of animals, will do so illegally.

Nevertheless, treating by shoeing smiths of diseases of the foot, the operation of castration of animals other than equidæ, and emergency treatment (except in cases of contagious diseases) will not be held to come within the Act.

Article 6.—As a transitory provision, and notwithstanding Article 1, persons of French nationality who are at the date of the passing of this Act actively practising Veterinary Medicine and Surgery are authorised, within the limits of the law, to continue during their lifetimes the practice of their profession. Such persons must arrange for the entry of their residence on a special register kept at the Prefecture of their province, which register will be closed two months after the passing of this Act.

Under the same conditions, persons of French nationality aged from 17 to 25 or over may demand their provisional entry in the register, if they have been under apprenticeship for at least one year at the date of the passing of this Act. The final registration giving such persons the right to practise Veterinary Medicine and Surgery within the limits of the law will not be accorded to them until they can bring proof of having accomplished three years' apprenticeship.

The preceding provisions are applicable to foreign Veterinarians exercising the profession in French territory before the passing of this Act.

In each case of litigation as to the right to be registered provided for above, the Prefect will give judgment after taking the advice of a commission composed of an official of the prefectorial administration, the provincial Director of Veterinary Services, and a member elected from the Chamber of Agriculture.

Persons of foreign origin having obtained French nationality before the passing of this Act and holding a Diploma as Veterinary Surgeon or Veterinary Doctor, awarded to them as foreigners, either abroad or in France, and who are practising their profession on French territory before the passing of this Act, are authorised to enjoy the rights and prerogatives attached to the French State Diploma of Veterinary Surgeon or Veterinary Doctor. Such persons must, if they do not wish to lose their rights, within two months of the passing of this Act demand the registration of their

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residence at the Prefecture of their province in the list of Veterinarians provided for in Article 4.

The same provisions are applicable to persons of French nationality holding foreign Veterinary Diplomas and practising in France before the passing of this Act.

Article 7.—Any infraction of this Act will be punished with a fine of 16 to 50 francs. A repetition of the offence will be punished with a fine of from 100 to 500 francs.

These provisions do not apply to the owners of animals.

Article 8.—A Public Administration order will make the present Act applicable to Algeria, the Colonies and protectorates.

CALCIUM BOROGLUCONATE

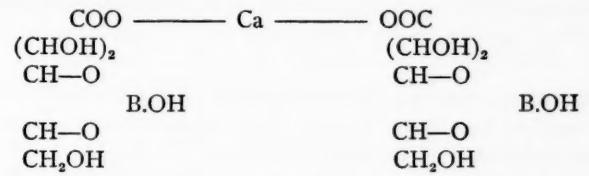
By JAMES STEWART and HERBERT TAYLOR MacPHERSON

Moredun Institute, Animal Diseases Research Association, Gilmerton, Midlothian

Since Greig (1930) first introduced his method of calcium therapy for the treatment of milk fever in cows it has proved one of the most striking successes achieved in the whole history of animal disease research. Of the several calcium salts which he examined, calcium gluconate proved the most successful, its only disadvantage being the difficulty of stabilising solutions of a strength above that of 5 per cent.; this concentration was, in fact, regarded as optimum since weaker solutions entailed the injection of a very large volume of fluid in order to administer the requisite dose of calcium, while stronger solutions increased the risk of re-precipitation of the salt at the site of the injection, an occurrence which was often attended by serious local reaction. This difficulty was overcome when in 1934 Greig advocated the use of calcium borogluconate instead of calcium gluconate *per se*. The name calcium "borogluconate" was suggested by Dryerre and Greig (1935) for the substance formed on evaporation of an aqueous solution containing approximately five parts by weight of calcium gluconate and one part of boric acid, these being the proportions used for parenteral administration. It was also shown that this substance was about thirty times as soluble as calcium gluconate at 15°C.

In a recent paper by the authors, Macpherson and Stewart (1938), proof is given that calcium borogluconate proper is a definite compound formed

from one molecule of calcium gluconate and two molecules of boric acid by loss of water, and the formula



is suggested as that which most probably conforms to its chemical characteristics, i.e., the compound is really calcium di-borogluconate. From the above it is at once evident that the borogluconate made according to the directions of Greig is really a mixture of calcium mono- and di-borogluconates and not a definite compound since the percentage of boric acid in the true compound would require to be 25.73 per cent., whereas that made according to Greig contains only 16.67 per cent. It is also shown by the authors that these complexes existed as stable compounds in the solid state only and that in aqueous solution they were immediately split up into free calcium gluconate and boric acid.

The purpose of the present paper is to dissipate any apprehensions that may be felt by veterinary practitioners, in the light of the above finding, in the use of calcium borogluconate prepared as suggested by Greig, because in practice no advantage is gained by preparing the compound itself since dissolving a mixture of calcium gluconate and boric acid in the same proportions would yield an identical solution. Therefore parenteral injection of a solution of calcium borogluconate is in fact an administration of calcium gluconate and boric acid, and the superiority of such a mixture over calcium gluconate by itself lies in the much greater solubility of calcium gluconate in water in the presence of the boric acid. This ensures that a relatively concentrated calcium gluconate solution can be injected subcutaneously without fear of the local precipitation of the calcium gluconate and the resultant sloughing which was one of the disadvantages of the subcutaneous administration of calcium gluconate. Moreover, the calcium borogluconate solution as described by Dryerre and Greig is more useful than a 20 per cent. solution of the true compound in that it contains a slightly higher percentage of calcium, the chemical substance upon which the curative action actually depends.

The hydrogen-ion concentration of solutions of calcium borogluconate is very low, that of the solution of true di-borogluconate being 3.5 and that of Greig's solution being 3.7, and, although no ill effects attributable to this have so far been noted, solutions of such *pH* value may be considered unsatisfactory for intravenous injection. Accordingly it was considered desirable to attempt the preparation of calcium gluconate solutions having a *pH* value closer to that of blood, yet which would be stable in concentrations of 20-25 per cent. Sonol (1936) claimed that solutions in concentration up to 20 per cent. of

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calcium gluconate can, without addition of other substances, be stabilised by heating at 120°C. for 20 minutes. The authors were unable to substantiate this statement, in that they found that solutions prepared in this way crystallised out within 24 hours, especially if kept at temperatures such as 10°C.

Among the various solvents tested by the authors the most satisfactory was found to be calcium borate. This substance was chosen since it might be expected to have a twofold usefulness. Firstly, the borate radicle should assist in increasing the solubility of the calcium gluconate, and secondly, the percentage of calcium in the solution should be simultaneously increased. Experiments showed that when 20 g. of calcium gluconate and 2 g. of calcium borate in 100 c.c. water were raised to boiling-point for one or two minutes and then filtered, the resulting filtrate remained stable for at least six months and that the calcium content was 2.15 per cent. as compared with 1.66 per cent. of a 20 per cent. calcium gluconate solution in 4 per cent. boric acid, an increase of 25 per cent. In addition, the *pH* of the filtrate was found to be 9.7, much closer to that of blood than 3.7. It would appear, therefore, that in the preparation of calcium gluconate solutions for parenteral injection, calcium borate should prove more satisfactory than boric acid. Calcium borate unfortunately is of low solubility in water, but if the solution is prepared in accordance with the above directions no trouble need be expected on this account since the calcium gluconate and calcium borate mutually increase each other's solubility in water.

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MEAT INSPECTION

By Lt.-Col. T. DUNLOP YOUNG, O.B.E., M.R.C.V.S., D.V.S.M.

THE inspection of imported meats in Great Britain has, for a long time, received very careful attention, and stringent regulations framed by the Minister of Health have made the work not only easy but very effective. These Regulations have been amended or re-drafted from time to time when weakness in their effects has been observed. The latest issue consists of "The Public Health (Imported Food) Regulations, 1937," dated April 16, 1937, made by the Minister of Health. These contain considerable alterations of previous regulations, the chief being the requirement

of "Official Certificates" of the countries of origin with all meat and meat products. Under the Regulations of 1925 and 1933 such Certificates were only required with meats classed as "Conditionally Admissible Meat."

The new Regulations prohibit the importation of the kinds of meat specified in the First Schedule, viz.:—

First Schedule

Prohibited Meat

(a) Scrap meat, that is to say, meat which consists of scraps, trimmings or other pieces (whether with or without bone) of such shape or in such condition as to afford insufficient means of identification with a definite part of a carcase.

(b) Meat comprising the wall of the thorax or abdomen from which there has been detached any part of the pleura or (except in the case of meat derived from a pig) the peritoneum, other than a part necessarily removed in preparing the meat.

(c) Meat from which a lymphatic gland, except a gland necessarily removed in preparing the meat, has been taken out.

(d) The head of an animal without the submaxillary gland;

and also prevent the importation of *any meat or meat product*, as defined in the Regulations, unless accompanied by an Official Certificate of the country of origin which has been recognised by the Minister.

The classes of meat product with regard to which Official Certificates are required are specified in the Second Schedule, viz.:—

Second Schedule

Meat Products

(a) Meat packed in air-tight containers.

(b) Cooked or dried meat.

(c) Intestines and other parts prepared in the form of sausage casings.

(d) Rendered animal fats except in margarine.

(e) Pies, sausages and other prepared or manufactured articles of food containing any meat or cooked or dried meat other than fat.

"Official Certificate" means a certificate, label, mark, stamp or voucher which is affixed by a "competent authority" to any over-sea meat or meat product or to a package containing any such meat or meat product, and is for the time being recognised by the Minister as showing:—

(a) that the meat to which it relates or the meat from which the meat product to which it relates was prepared, was derived from animals

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inspected ante and post-mortem and passed in accordance with criteria satisfactory to the Minister; and (b) that all necessary precautions for the prevention of danger to public health were taken in the dressing or preparing and packing of the meat or meat product.

The criteria referred to must not be of a lower standard than that set out in Memo 62/Foods, Circular 282, dated March, 1922, and Memo 62a/Foods, dated September, 1937.

It is to be regretted poultry has not been included in the Regulations. There are large numbers of diseased poultry in our Markets, chiefly old hens, and it is impossible to examine all these prior to sale. The difficulty could be overcome by including poultry in the "notification of intention to slaughter," part of the public health with an increase of the number of meat inspectors in all urban and rural areas where meat and food inspection should be the duty of officers specially appointed for that class of work and not be part of the work of the sanitary officers' multifarious duties. It is illogical to think that a sanitary officer can be on duty from 7 a.m. to 7 p.m., which apparently he is expected to be if he carries out the inspection of meat as required.

The Public Health (Preservatives in Food) Regulations, 1925, as amended by Regulations dated December, 1926, and June, 1927, should be read in conjunction with the 1937 Regulations.

A STATISTICAL SURVEY OF MEAT-POISONING IN GERMANY AND ITS PREVENTION

By Dr. M. F. BENJAMIN, Dr.Med.Vet.(Berlin), M.R.C.V.S.

Paddington, London, W.2

ONE of the most important branches of meat-inspection on the Continent, especially in Germany, is the so-called "bacteriological meat-inspection."

As meat of cattle slaughtered in cases of emergency may be used and is often declared fit for human consumption, cases of meat-poisoning have often occurred.

Bollinger, Munich, was the first in 1876 to record 17 cases of meat-

poisoning, affecting 2,400 people, with 35 deaths. He published his own conclusions on this subject (Bollinger's Blood-poisoning Theory). Since this time thousands of cases have been reported from all over the world, Bacteriological meat-inspection has become important to veterinary meat-inspectors, especially in Germany, and numerous articles and statistics have been published.

Regarding the diseases which are often encountered causing meat-poisoning, we find that gastro-enteritis is the most common. Next are those diseases which come under the heading of Bollinger's Blood-poisoning Theory. In an institute, well known to the author, over a period of five years 170 cases of bacterial meat-poisoning were encountered. Eighty cases originated from gastro-enteritis, 50 from septicæmia or post-parturient sepsis, and 40 from various other sources. Statistics supplied by the Potsdam Institute indicate that the sources of bacterial meat-poisoning were as follows:

White scour	150	Standfuss nomenclature: primary animal paratyphoid
Enteritis in cattle	40	
Suipestifer infection	2	Secondary animal paratyphoid
Diseases of female genital organs	31	
Mastitis	8	
Pericarditis and ascites	7	
Abscess formation	6	
Various diseases of the aliment track ...	16	
Pneumonia	10	

Most of those diseases in the secondary paratyphoid group were due to B. Gaertner.

The relation of different species of animals to meat-poisoning constitutes a point of interest to the reader. Statistics indicate that cattle are most likely to cause meat-poisoning:

	Standfuss 1866—1919	Kuppelmayr 1913—1922	1923	R. Mayer 1924	1925
Horse, % ...	6.3	40.7	47.5	19.4	25.0
Cattle, % ...	56.8	31.9	40.0	41.9	59.4
Calves, % ...	25.2	5.3	2.5	9.7	3.1
Pigs, % ...	9.0	21.2	10.0	25.8	12.5

On the other hand, shortly after the Great War, consequent upon shortage of beef, horseflesh headed the list, those eating it suffering in the majority of cases from colic.

Regional incidence is of interest in that most cases of meat-poisoning

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happen in North Germany, Bavaria and the South having only few cases. The supposed reason for this is the preference of the North German for partly cooked or raw meat. It seems that the presence of bacteria alone is not sufficient to cause meat-poisoning, but that other factors might play a part, such as time of year, method of slaughter, handling and storage of meat.

R. Mayer gives the following records of poisoning in relation to the time of year.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Epidemics	10	7	3	14	25	27	18	34	26	22	11	8
Cases	543	160	72	171	568	708	1,005	1,329	792	405	559	86
Deaths	11	3	—	3	4	4	6	13	5	4	8	7

With regard to the type of bacteria, the records of Lentz (German National Health Institute) show that up to 1924 25.4 per cent. were Sal. Gaertner and 74.6 per cent. of the other Salmonalla types. Most of those, no doubt, belong to the Breslau type (Sal. typhi. murium Loffler). According to Boecker and Silberstein the following types were identified in the years 1928-32.

Organism	Varieties	Outbreaks	%
Bac. Enteritis, Breslau	98	46	59.0
Seuftenberg, Stanley, Reading	17	6	7.1
Suipestifer, Voldagsen, Morbificans bovis ...	36	14	18.1
Gaertner, Jena	17	10	15.4
Gaertner, Dublin	7	2	

Prevention.—To minimise the danger of infection by eating meat of diseased animals, Germany devised special and distinct regulations concerning meat inspection in emergency cases. Paragraph 29 of the German Meat Inspection Act states in which cases bacteriological meat inspection has to be carried out. That means, that all cases of emergency slaughtering, all cases where there is systemic disturbance, all cases when the dressing of the carcase has been delayed or where an important internal organ is missing, are subject to bacteriological meat inspection. Therefore the following diseases render a bacteriological meat inspection compulsory: mastitis, metritis, enteritis, arthritis, synovitis, omphalophlebitis, diseases of the hoof and claws, lungs, pleura, peritoneum, any suppurative focus and also if the animal is proved to be a carrier of Bac. Gaertner. Naturally in all cases in which bacteria of the meat-poisoning group are found, the carcases have to be seized. For this bacteriological examination different parts of the carcase must be sent in to Institutes which specialise in that branch of meat inspection. Such parts are: a piece of muscle, covered by its fascia, from the forearm and the shank. One lymph gland of each of the other quarters (axillary and iliac), including

the surrounding fat and connective tissue; the spleen, one kidney, the caudal lobe of the liver with the gall-bladder and the hepatic lymph gland, and any part showing pathological change. From these parts different cultures are sown. All plates are incubated for at least 18 hours at 37°C. If bacteria are found, the agglutination test and colour reactions have to be carried out.

The time taken for this examination is 24 to 48 hours. The veterinary surgeon in charge of such a case receives the result of the examination within two days and can then with safety pass or condemn the carcase. Since 1925 Germany has enforced bacteriological meat inspection for all emergency slaughtering. Following upon research carried out over the last 20 years, meat poisoning can to a certain extent be avoided and consequently the incidence has markedly decreased.

The records of the last six years show the following meat-poisoning epidemics:—

Casualties	1931	1932	1933	1934	1935	1936
Affecting over 300 people	—	1	—	1	—	1
200—300	—	—	1	—	1	—
100—200	—	1	2	1	—	3
50—100	3	8	2	6	6	7
25—50	3	3	7	2	4	7
10—25	11	19	13	15	14	4
5—10	135	124	12	22	8	9
1—5			112	113	86	77
	152	156	149	160	119	108
Deaths	40	42	37	38	27	14

THE IDENTIFICATION OF CATTLE

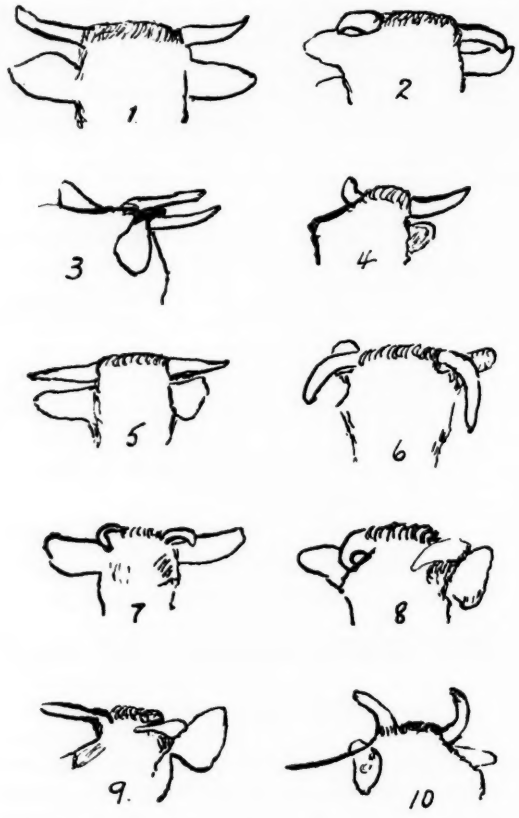
By G. MAYALL, M.R.C.V.S.

THE recognition again of cows or bulls that for one reason or another we want to identify is not so easy as in the case of horses. In routine inspection of ordinary herds, accredited herds and tuberculin tested herds we often want to specify a certain animal. In order to do this *colour* is perhaps the first thing we put down, or breed and colour.

In a mixed accredited herd of 86 cross-bred cows the colours were as follows: five black and white, forty-five dark red roan, twenty light red roan, seven blue speckled cows, five red and little white cows, one black cow, one grizzled cow and two red cows. All these were horned cows and all had identification numbers burnt on their horns. The "burn" number on the

horns seems the usual method to distinguish individual cows in an accredited herd.

There are other signs, both in ordinary herds for routine inspection and in accredited herds, that should be noticed, and in horned cows the pitch and trend of the horns is important. I have made a few sketches of different



horns from Pusch's "Beurteilung des Rindes" that may assist in the identification of individual cows. They include: (1) high set horns, (2) low set horns, (3) thrusting horns, (4) horns back towards neck, (5) transverse horns, (6) drooping horns, (7) dwarf horns, (8) pincers horns, (9) curved horns, and (10) lyre-shaped horns.

The tail of the cow should be noticed. It may be a thin, low set tail, or a fat, high set tail, and may be clipped or unclipped.

A dry udder and a freshening udder or one in full milk may be noticed. The set on and character of the teats, and the base of the udder as to length, width and adherence may be observed. A pronounced escutcheon and supernumerary teats also occur sometimes, and broken horns now and then.

With regard to polled cattle tattooing, ear clips or ear punching seem to be the methods of identification.

The shape, extent and position of the blaze on a cow's head may help us sometimes. Of course, all men should be able to recognise the breeds of cows. Often a marked Ayrshire type of cow appears among short-horns, now and then a blue Albion, and again a Guernsey, or Jersey, and the old long-horn Lancashire cow may be seen, and Friesians are not uncommon in the North.

FREE CLINICS FOR ANIMALS

By R. ISHERWOOD, M.R.C.V.S.
Veterinary Hospital, University of Liverpool

THE first problem presented to the "free" clinician is in respect of the owner of the sick animal. Can he or she be considered genuinely entitled to expect it to be treated free of all charge?

The question is easily answered in most cases, but occasions arise almost daily when there is some doubt, and in some instances treatment is not undertaken, and the owners are referred to veterinary practitioners.

Experience has shown that there are certain useful guides, but that they must not be considered as infallible. Very often the type of person and dress are sufficient, but one has to be very careful of the dog "conductor." That is to say, the species of fraud perpetrated by people in reasonably comfortable circumstances in sending their dogs or cats with an obviously poor person. These in addition are often half-witted, deaf, or stammer to a painful extent. They are wholly unable to give any account of either the animal or the owner. A reference to a map of the district, or the local knowledge of a "lay" attendant are always useful in such cases.

Then there is the other and more painful side; the person who has fallen on bad times comparatively recently. Generally an animal of good quality is accompanied by the owner who is dressed in his best suit. Tactful questioning will usually elicit the information that either he has been out of work for a few months, or in the case of a woman that her husband died a short time ago. It would be tragic if such cases were rejected on face value, or offended by blundering interrogation.

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But the problem of the animal owner is not by any means solved by simply accepting the animal for treatment. Human beings fall into different categories, and vary in their relation to, and capability of dealing with, animals. The best type is the one with a fondness for the animal not unhealthily exaggerated, who is willing to carry out instructions, and does so. Treatment can be undertaken with confidence. There are many such, but unfortunately there are others not in the least helpful; for example, the person who either does not or cannot follow instructions concerning diet, medicine, etc. The latter usually expects a lightning cure without any inconvenience to himself, and if he is not getting it, he either goes somewhere else or has the animal destroyed. He, or sometimes she, is a nuisance, and the fact that such people cease to attend the clinic is not a matter for regret. The former is entitled to some sympathy, but is a constant source of worry and disappointment. Quite obviously the clinician is very restricted in his treatment of such cases and they are likely to "hang on." Then there is the owner, usually a really poor man or woman with a nondescript dog, a very small house, and a multiplicity of children; the animal is not very ill as a rule, and in the ordinary way home treatment for a fortnight or so would effect a cure. But it is often requested that the animal should be retained as an in-patient "because of the children," failing which it will have to be destroyed. Once again the owner is the problem, and not the animal.

And there are many others with whom one can have very little sympathy; they will not continue to keep an animal if it has begun to require some special attention; they are fond of the animal in their way, but it is entirely a selfish adoration. Throughout its life the animal, usually a dog, has given no trouble at all, and has now arrived at a hearty old age, and perhaps after the removal of a few warts will, in the ordinary run of things, be good for a few years more. This is explained; but the inconvenience is too great, and on the grounds that the owner could not bear the thought of him suffering, he is condemned to death.

So much for the owners, and especially those of the canine patients which occupy most of the time of the "free" clinician. Mongrels of all shapes, sizes, ages, and dispositions keep him busy for the most part. He soon ceases to worry about this consistent lack of quality, and he does see some astonishingly good results of accidental crossings.

This succession of unnameable dogs is relieved by a not very free interlarding with other animals; the hawker's pony which is very old, and has gone lame, and it is usually well cared for; the slum dweller's hen which with a few others occupies a diminutive backyard, and tries to justify its existence by laying an occasional egg; the sportsman's pigeon which is very prone to deficiency disease; the elderly lady's parrot which never says anything, and periodically requires attention to its beak and claws; the canary which has

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damaged a leg, or has stopped singing; the child's pet rabbit or rat; the monkey which has been brought home by a sailor, and left there to pine away and die, which it very soon succeeds in doing; and, of course, the domestic cat, which has shown distinct signs of increasing favour during the last few years.

The dogs for the most part begin their clinical attendance at a very early age. And curiously enough they are quite often not brought for the relief of suffering, but for its infliction. The owner has been told that to remove part of its tail, and thus take away the worm, will stop it from getting distemper; or it may be that the puppy does look a little like a member of one of the breeds which is thus barbarously treated. And when the operation is refused the owner goes away unconvinced. A little time goes on, and the puppy which has begun a life beset with mistakes and ignorances, returns to the clinic. He has received no meat because it would either make him fierce or cause him to smell. At the best he is now a mild case of rickets. Or he has become distemperish, hysterical, has had a few fits, and is harbouring worms. He has been dosed with proprietary powders, but the conglomeration of forces operating against them is too great, and this second visit has become necessary. Treatment in many cases of this kind consists largely in adjustment of diet, removal of worms if the evidence of infestation is good and other conditions favourable, and a bottle of medicine to meet the case and make the advice appear more convincing. After a few weeks the rule is that the dog has made a good recovery, and has begun to arrive at an age not so susceptible to disease and mismanagement, and, accidents apart, will not require professional attention for a few years.

But sooner or later, depending on his luck and constitution, he will become a subject of the complex " skin, ears, and mouth." His attendance is now fairly regular—probably for a month or so—during which time symptoms have gradually subsided, generally after considerable resistance by the skin. And from now onwards his attendances are intermittent, and serve chiefly to remind the owner that he is not carrying out dietetic instructions.

But old age creeps on. Stomach and kidney function have become inferior due to organic change, and the heart is dilated. Appetite is fickle, vomition is rather a prominent symptom. The skin is unhealthy, the animal is profoundly depressed, and there are other signs which augur comparatively early dissolution. Or the development of inoperable new growths may decide his fate, or he may have become blind. Usually he has had—from a dog's point of view—one would imagine, a good time; and if the owner is sensible he will see to it that his life ends at this stage.

The above picture is representative of a large number of canine cases. With them is a generous sprinkling of every other type; the troubles incidental

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to parturition, the pyometra of the unmated; the swallowed foreign body; wounds, fractures, and every other description of injury.

The common cat, as one would expect from an animal of such independence and resource, presents problems peculiar to itself. In the first place it often has an owner quite different from that of the average dog. There is the lonely person, probably a middle-aged spinster with no other outlet for stored-up affection, and with very little means. The cat answers her requirements adequately, gives no trouble, costs practically nothing, and returns a modicum of affection at his own convenience. And all the time he retains his own individuality, and never allows himself to be mentally submerged. The second type of cat owner is drawn from people of the labouring class, who live in small houses with large families of their own, and would have large families of mice if they did not keep a cat. This latter group is a very large one, and it may be said to consist of working people who keep a working cat.

The neutering of male cats in a clinic of this kind appears to be entirely justified, as the effect on the animal is to make it cleaner without impairing its usefulness; it cures its wandering tendencies, and in general prolongs its life. It is for this operation that the cat makes its first visit to the clinic in many cases. With average fortune it will now go on to old age, but like the dog in similar circumstances it will go through a life of dietetic error. The female will generally commence to produce and rear families from quite an early age, and throughout her life will in all probability manage many families without trouble. But, particularly while they are young, feline enteritis or influenza may overtake either male or female and put a period to their existence. It is a very common experience to hear a history to the effect that the cat was suddenly stricken down with illness, and that the owner thinks that some neighbour has poisoned it. Or the cat is brought to the clinic for the removal of a bone which is supposed to be stuck somewhere in its throat. Both are nearly sure signs that the animal has influenza or something of that nature, and will probably die. Fish bones are responsible in some cases, of course, but this is soon ascertained. During adult life septic bites are common, and are very often resistant to treatment; also abscesses in the submaxillary region may cause frequent visits and eventually clear up. Very many cats suffer from canker of the ear, and in them it is nearly always parasitic. Constipation—due largely to swallowing quantities of hair—is a not uncommon experience; also skin irritations which are largely non-parasitic, and the inevitable injuries due to motor car accidents.

Fortunately the cat is usually a very good patient, nursing itself well, and looking after a damaged limb with meticulous care. But there is some difficulty when it is necessary for the owner to give medicine, and for this reason treatment may be somewhat restricted.

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So much for the owner and the animal. But this does not complete the story. The skill of the clinician, his knowledge of, and sympathy with, animals are very great factors in the success of the clinic, but his understanding of mankind is almost of equal importance. He should be careful lest he should convey the impression to animal owners that they are being dealt with as a concession to charity. He should be patient when he is being told irrelevancies concerning the family ups and downs. In short, it should be his endeavour to behave to the owners of his patients in the clinic much in the same manner as he does to his more fortunate ones.

Most people are worthy of this consideration, and it does not take long to sort out the ones who are not. Thus the owners retain their self-respect and make repeated attendances with their animals, instead of only one visit of discovery; and the clinician is able not only to pile up experience of animals and their diseases, but has the opportunity of securing an invaluable insight into the manner of living of a section of the community about which he might otherwise have no knowledge.

ANIMAL HUSBANDRY IN PERU

By Colonel ROBERT STORDY, C.B.E., D.S.O., M.R.C.V.S.

Formerly Veterinary Adviser and Animal Husbandry Expert to the Government of Peru

SHEEP are essentially mountain animals, and while the wild and magnificent *ovis poli* of the Pamir plateau inhabits elevations of 16,000 feet above sea level, domestic sheep in general are unaccustomed to these extremely high altitudes; the great majority of the sheep population of the globe will be found on the vast plains of Australia and New Zealand, the Karoo of South Africa, the extensive grazing lands of Argentine, Patagonia, Uruguay and the United States of America, or on the hills and valleys of Britain, where the mean altitude does not exceed a few hundred feet above the level of the ocean.

It will be at once apparent that for those high locations—nestling as they do beneath regions of eternal snow—a breed of sheep of exceptional physical development is essential for the peculiar environment in which it finds its home.

This development in short is: a good deep symmetrical body, ribs well sprung giving capacity to the chest, broad across the shoulders, well quartered, and, in the case of the ewe, well-developed milk vessels, legs not too long, but exhibiting plenty of bone and possessed of sound hard feet. The face

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should be white, and the fleece, rising from a pink skin, should be long stapled with a soft handle and have the characteristics of an elastic wool.

The ideal type would be very similar to the Corriedale of New Zealand, but, as the altitude and general condition of the Sierra tend to the production of a fine wool, we may hope to obtain a dual-purpose animal which, yielding a carcase of size and good flavour, will also give a fleece of remarkable lustre and fineness.

To evolve such a type will occupy a good number of years, and one has only to glance at the records of New Zealand to appreciate the long period necessary to raise a breed to standard class.

In New Zealand, sheepmen used breeds established for centuries in their cross-breeding experiments, while here the degenerative native ewe has been put to use. Very successfully, it is true, but its use must delay the fulfilment of our aspirations.

First Experiments at the Granja Modelo de Puno

Sailing along the barren and arid coastline of Peru, there is nothing indicative of those rich pasturelands lying within the hinterland, to which the Conquistadores imported the Spanish Merino in the sixteenth century.

Along with the fine white-woolled Spanish Merino the Spaniards imported a black sheep—now know as the Spanish Park sheep—a sheep without one redeeming feature, black as coal in colour, with white markings on the poll and a white tip to its tail.

It was the importation of this sheep that has given rise to the large percentage of coloured animals in the flocks throughout the Republic, more particularly those the property of the Indian community.

On the pasturelands of Spain to-day, the disastrous effects of the Spanish Park sheep are evidenced by the large percentage of blacks to be seen in nearly every flock, and it is, to say the least, regrettable to find the once famed and highly treasured merino so despoiled in the country of its origin.

When the preliminary survey of the livestock industry of Southern Peru was made, it was found that there was little or no data on which to place reliance, for few importations of pure-bred stud animals had taken place and only the organised system of sheep farming carried on at Atocsaico in the Department of Junin, under the expert supervision of Scotch sheepmen, remained as a guide, for the potentialities of the vast Sierra of Southern Peru as a sheep country had never been considered from a practical standpoint, and a reference to the wool map of the world shows that Peru, at that time, was only known as a producer of llama and alpaca hair.

This short description of how things stood previous to 1921 is made

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in order to appreciate the problems and difficulties which confronted the Granja Modelo de Puno on the threshold of its labours.

In May of that year occupation of the Granja lands was taken over, and the delivery of 21,000 native sheep accepted from the owners of the farms Chuquibambilla, Buena Vista and Pacochuma.

Of this capital of sheep, 9,000 were in due course slaughtered and converted into "chalona"—a sun-dried and salted mutton similar to the "biltong" of South Africa—and from time to time, during the first two years of operations, old, broken-mouthed, coloured and kempy ewes were similarly dealt with.

It is not for a moment to be thought that the native ewe is worthless, but exacting culling is required, for, as a general rule, 33 per cent. of native stock is unfit for breeding purposes. The native ewe is an exceptionally good mother with a good lacteal secretion, and her cross-bred progeny gives every indication of her value as an inexpensive and convenient foundation in the breeding scheme of any farm.

Her degeneration is due to haphazard inbreeding, which has been perpetrated since her importation into South America in the middle of the sixteenth century, and to such a state of degeneration has she been brought that her average live weight is but 45 lbs., her appearance is scraggy, the under surface of the body is devoid of wool, and what fleece she possesses is some 1½ lbs. in weight. The wool in individual sheep still retains its merino characteristics, but in general the wool is "wasty," "kempy" and short.

The Granja at its inception had more or less 10,000 to 12,000 native ewes of all ages and sizes, and after due consideration a line of breeding was decided upon which gave promise of improving, in the shortest period of time, this lamentable deficiency in body, bone and wool.

For this purpose the following breeds of sheep were imported from England, Scotland and France: Southdown, Hampshire Down, Suffolk Down, Shropshire Down, Soay and Rambouillet Merino.

It will be noticed that various breeds of Downs were brought, as it was necessary to put to practical test these breeds of English sheep which had so pre-eminently adapted themselves to the conditions of every country into which they had been introduced and had imprinted their sterling qualities in cross-breeding experiments in many parts of the world.

The first mating season proved to be full of disappointment, as it was found that a large percentage of the native ewes were in-lamb to native rams, while many others were not in "season." This latter condition is a problem which has so far defeated us, and, to obtain the full use of ewe flocks, the only practical solution of the difficulty has been to submit those which have not rutted in July to another mating in January.

This necessitates two lambing seasons, one in December and one in

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June, and while the general conditions do not favour a lambing-down in June—mid-winter—the results have so far well repaid the extra time and labour involved, and it is a preferable system to keeping yeld ewes over a long period.

The employment of the big-framed heavy Down rams on the native ewe gave rise to some apprehension as to how the ewes would fare when lambing-down, but, with the exception of several cases of difficult labour due, in the majority of cases, to the broad shoulders of the Southdown cross proving an obstacle to easy parturition, few cases of dystokia were recorded and, as a matter of fact, have been recorded since the Granja Modelo commenced its activities.

The resultant Down crosses—with possibly the exception of the Shropshire—exceeded expectations in so far as size, conformation and bone were concerned; there were, of course, imperfections and failures, but these were to be expected in carrying out a breeding experiment of such magnitude.

The Southdown crosses were admirable, and to this day the compact and sturdy frames of this world-renowned breed are to be discerned in the higher graded sheep composing the Granja flocks.

The Hampshire and Suffolk also produced excellent types of cross-bred lambs, but the mating of these black-faced breeds with native ewes of unknown pedigree led to the production of black fibre, and in consequence their use for stud purposes was discontinued.

The Shropshire Down crosses were the only ones that failed to please; they were very uneven, exhibited coarse wool, and the potency of the sire to eliminate "kemp" was negligible.

The Soay rams—a sheep dark brown in colour, to be found marooned on the uninhabited island of Soay on the west coast of Scotland, and of the most primitive type—were possibly imported into Scotland some 2,000 B.C.

The cross-bred wool was found to be extremely sound and fine, but, due to some peculiarity in constitution—possibly the inheritance of some ancestral character—there was constant shedding of the wool, a condition which in itself rendered further experiment inexpedient.

According to what was expected, the mating of the Rambouillet Merino with the indigenous merino ewe proved highly successful in so far as wool was concerned, but the body conformation and robustness left much to be desired. The wool, too, although the first shearing was good, subsequent clips were found short in staple and, in aged ewes, the fleece "clipped out" badly—that is to say, yielded a small weight of wool.

Still, the half-bred Rambouillet has proved itself eminently useful in the more advanced breeding which the Granja has conducted.

In 1924 a small consignment of Dorset-Horn Down rams—a breed

renowned for its extremely white wool—was put to experiment to ascertain if this dominance to white would obtain in the progeny.

The lambs produced were of good size, but the fleece, pure white in colour, was found to be at the end of twelve months very light in weight, short in staple, and the soft and lofty handle so outstanding a characteristic in our cross-bred wools was absent. The formation of horns in both sexes proved another disadvantage, for, sheep running free between wire fences, the fewer the horns the fewer the casualties.

With the exception of a few flocks of native sheep, the Granja in 1926 had large holdings of half-bred Merinos and half-bred Downs, and as the cross-breds represented a class of sheep strong of bone, compactly built and robust in constitution, it was decided to use the Rambouillet Merino crosses with the long-stapled Australian Merino rams, and the Down crosses with the Corriedale, a breed created in New Zealand from the crossing of the English Lincoln ram with the Merino ewe.

In October, 1926, a consignment of Australian Merino and Corriedale rams was brought from the Argentine.

When the first lot of rams were imported from England in March, 1921, it was considered—in our inexperience—that before submitting them to the extremely high elevation of the farm, a period of acclimatisation should be passed in the vicinity of Arequipa, and for this purpose a farm at Tiabaya was rented.

This procedure was not only a mistake, but proved distinctly prejudicial to the health of the animals, so now all new importations go direct to the Sierra.

It will be readily appreciated, however, that rams, translated from sea level to an altitude of 13,000 feet, must be treated with every care and attention, for the rarefied atmosphere causes a marked change in the blood pressure, with corresponding disturbance in the functions of the heart, lungs and digestive system, and it has been our usual custom to restrain the rams from any degree of exertion for at least the space of one month from the date of their arrival on the farm.

When the rams are put to stud purposes, the ewes are folded in convenient paddocks of not too great dimensions, so as to spare the rams as much as possible; or the rams are housed and sheltered during the heat of the day and turned in among the ewes at night time.

This latter system has worked admirably, and the preservation of the rams' condition demonstrates its utility.

A note of warning to importers of stud sheep should be sounded in connection with the introduction of "pampered" rams to Sierra conditions.

The "hot house" type of ram—one that has been fed on a highly nutritious diet with a view to its early maturity, and housed and coddled

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from birth—brings a poor armament with which to withstand the rigors of the Andean tablelands, and his potency as a sire, under the changed conditions in which he is called upon to live, leads, in the majority of cases, to dissatisfaction and loss.

With the advent of the Australian Merino and Corriedale rams a new chapter was opened in the breeding programme of the Granja, and the results obtained both in size of animal, weight of fleece and quality of wool have been nothing less than a revelation, and confirm—if further confirmation were needed—the immense potentialities of Southern Peru as a wool-producing country.

The progeny resulting from the mating of Australian Merino rams with the half-bred Rambouillet ewes have given great satisfaction. The animals are of good size and conformation, and the fleece has developed in quality to a wool of 64's to 70's count, and the length of staple is what is desired in a country where shortening of the staple obtains.

The Corriedale, with its massive frame and abundant fleece of long-stapled wool, has given such results as stamp this animal as the one *par excellence* for the Peruvian Sierra.

The crosses yield an average fleece of 5 lbs. of beautiful crimpy wool, lustrous in character, and at fifteen months have an average live weight of 35 kilos, and give a dressed carcase of 40 lbs.—or almost the live weight of its native mother.

The Corriedale is prolific and endows its progeny with this valuable quality.

By using Corriedale rams, a lambing of 80 per cent. can be anticipated, always provided that the ewes are in good breeding condition, for this aspect of sheep farming is greatly influenced by climatic and grazing conditions, and a liberal feed just before and during the rutting season ensures a good lambing. The lambs, too, are dropped well covered with wool—hence the mortality, even in bleak conditions, is small indeed.

A dual-purpose breed will benefit the farmer both in the value of his capital in livestock and his balance at the bank, and an attractive and lucrative business is offered him in supplying mutton to the centres of Arequipa, Cuzco, Mollendo and Lima, to La Paz, the adjacent ports and Chile and north to Panama.

In January, 1928, six highly bred Corriedale rams and forty ewes were imported from New Zealand from the famous farms of Bushey Park and Hui Hui. This importation was made with the intention of creating a small flock of locally bred stud animals. The results to date are gratifying, and at June mating a few of the young rams will be put on trial.

With the arrival of another consignment of rams in June, it is anticipated that by the end of 1932 the Granja will be in a position to undertake extensive

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in-breeding experiments with a view to fixing and establishing standard types.

The three-quarter-breds, of which the Granja possesses some 4,000 head, only require this further infusion of fresh blood to raise them to the standard necessary for these advanced experiments.

In England to-day, with its thirty to forty breeds of sheep, expert sheepmen are found engaged in cross-breeding experiments—experiments designed to retain the best and eliminate the worst points of the breeds employed, and if these are necessary in a country which exports the finest types of pure-bred stock to every part of the wide world, certainly it behoves Peru, at the genesis of her endeavours, to determine the line of breeding to pursue to ensure her future prosperity and to raise her to that place among sheep-producing countries that her natural advantages dictate.

Wool

The indigenous wool of Peru has ever held an unenviable position in the wool markets, and the majority of sales are conducted in Liverpool and there sold, in most instances, under private treaty.

Notwithstanding the imperfections which make the wool of small commercial value, it possesses qualities which render it suitable for certain branches of the trade, for its lofty handle is found suitable for the manufacture of some classes of underwear, and the admixture of "kemp" has proved of utility in producing imitation Scotch tweed or forming the basis of novelty in dress fabrics.

"Kemp" is a straight, coarse, white fibre found intermingled with the wool fibres. In contradistinction to wool, which grows continuously, kemp grows only for a short time and is then shed. It has no felting or matting power and thus weakens the tenacity of yarn.

Prof. J. E. Duerden, of Rhodes University College, Grahamstown, South Africa, has devoted much study to the subject of kemp fibres in merino sheep, and has thrown considerable light on the origin of the fibres, their composition and their eradication.

He states:—

"The new-born lamb possesses an outer coat of coarse fibres, and an inner one of fine fibres admits of interpretation only on the assumption that its ancestors were similarly provided. The two coats of the lamb represent an ancestral stage in the evolution of the merino. Probably, as a result of selection under domestication, the kempy coat now largely disappears; but remnants of it may still persist on certain parts of the body."

In regard to the elimination of kemp, Prof. J. E. Duerden says:—

"The complete elimination of kemp fibres from the fleece of the merino, and from the limbs, head and tail were it necessary, presents no real difficulties; it is a problem in selective breeding, of gradually getting rid of certain

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hereditary factors from the germ plasm. It is manifest there is a strong natural tendency for kemp to disappear in the domesticated merino, and advantage must be taken of this. By the continued selection of rams and ewes showing the least number of coarse fibres, there can be little doubt as to their ultimate disappearance."

Peruvian native wool contains an abnormal quantity of kemp, a condition due to the haphazard manner in which through centuries sheepbreeding has been conducted, and its presence has been the main cause of the wool's low standard in the market.

The production of black fibre, too, is another serious imperfection, and even with the exercise of every care some black fibre may find its way from the sorting table into a bale of otherwise white wool, and condemnation of the entire pack is the result.

The selection of breeding stock must be stringent and constant, otherwise kemp and coloured fibres will persist, to the detriment of the clip.

There are various classes of this native wool placed on the market and sold in qualities according to the percentage of wool with merino characteristics contained.

The classification of the wool in the local warehouses is a slow and laborious process, and only the cheapness of the labour employed enables its separation into its several categories prior to shipment.

The use of the hand-shears on the majority of the farms is still considered an innovation, for the Peruvian farmer is conservative, and as he has found a knife or piece of glass, or the more modern substitute—the sharpened edge of a piece of galvanised iron—to suit his purpose, he cannot see any reason to alter his established custom.

He forgets that the knife, glass or piece of tin does not shear the wool but tears the delicate fibre into uneven lengths and leaves the animal deprived of its covering in such an irregular manner that the subsequent fleece grown is shaggy and faulty.

There is no occasion why this primitive method of shearing should continue, for the Indian becomes an expert with hand-shears in a very short time, and can shear fifty to sixty head of our big improved sheep or eighty head of the indigenous breed per day, and at a cost of approximately two centavos per head.

The experts at the Granja give lessons in the proper use of the hand-shears and the correct method of handling the animal during the operation, for the immemorial usage of tying the four feet of the sheep together with a llama-hair rope renders shearing impossible.

A number of farmers have availed themselves of the opportunity to send their Indians to receive instructions, but a few more pupils each season would help to spread the gospel of modernism still further afield.

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The improved Peruvian wools, which are the outcome of the Granja's activities during the past nine years, are in general attractive in appearance, exceptionally clean, very light in condition, long and crimpy in staple, of soft and lofty handle, and with a Bradford count of 60's and over in the three-quarter cross-bred Down-Corriedale and 64's to 70's in the case of the three-quarter-bred Merinos.

The fineness of the graded Corriedale is at once apparent, for the pure-bred Corriedale wool of New Zealand only registers a count of 50's to 56's. This fineness of the Corriedale wool augurs well for the future of the industry, but this attenuation of the fibre may require to be controlled.

Peruvian improved wools are probably the highest yielding known, and taking for comparison Australian Merino, which is more or less 50 per cent. wool and 50 per cent. condition, the Peruvian wools yield up to 70 per cent. of clean wool.

The production of condition—yolk and suint—is to a great extent influenced by the weight of the fleece and the temperature of the climate in which it is grown, and care must be taken that the "condition" be not too light, otherwise the wool may become considerably damaged, as the "yolk" is a protector of the fibre; on the other hand it is well to endeavour to obtain the happy medium, for a heavily conditioned wool means so much loss to the farmer on the gross weight of his clip, as the wool buyer calculates accurately the yield he may expect from his respective purchases, and his price for "grease" is never a high one.

Wool Production

There are certain essential principles in the production of wool which the farmer must follow if he is desirous of obtaining the best results for his expenditure of time, money and labour. These are: a good class of livestock, fencing, dipping, shearing and careful classification of his clip.

The stringent culling and careful selection of sheep for breeding purposes have already been discussed, and now a word or two on the importance of fencing.

Fencing

No animal demands so much freedom for its well-being as the domesticated sheep; without absolute freedom neither body nor fleece obtain their maximum development; again, some sheep feed best at night time, while others choose early morning.

The primitive system of herding leaves little choice to sheep to select the herbage they desire, and frequently the selection of grazing camps by the herdman is a matter of caprice or convenience.

To crush sheep into dirty kraals at night time is to invite disaster, for

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accidents, soiling of the wool, damage to feet, abortion and contraction of disease can all be attributed to this antiquated custom.

Fencing not only offers security to the livestock, but allows them freedom, the pasturelands are benefited by the congregation of flocks within a given area, and rotation grazing is made possible.

Fencing prevents trespass to a great extent, and the dangers from vagrant rams or scab-infected flocks are removed. The carrying capacity of the land is increased and the market value of the farm so enhanced that the initial cost of the fencing material becomes in the nature of a sound investment.

The Granja Modelo de Puno has thirty miles of fencing. This mileage only suffices to enclose the best grazing areas, and a further twenty miles is necessary to complete the boundaries of the farmlands.

The fence is an all-iron woven fence, of No. 9 gauge of wire throughout, straining posts are erected at every 220 yards, and by means of a ratchet system each section of fence can be made taut as occasion demands; intermediate posts are driven every fifteen feet, making the fence rigid and secure. Gates are placed at convenient points, and at the main paddock gates and on the line of native footpaths and byways iron stiles for pedestrians have been placed to avoid the opening of gates or damage to the fence.

Dipping

No farmer can hope to raise sheep successfully when he does not possess dipping facilities for his flocks, and as the operation is simple, safe and inexpensive there can be no excuse for the absence of dipping arrangements on any property dignified with the name of farm.

It cannot be expected that a skin infested with keds or mange mites can produce a vigorous and healthy growth of fleece, for the skin itself is in a diseased condition, and the irritation set up by the parasite causes the animal grave unrest which rapidly affects its general condition, and the constant scratching damages the wool to such an extent that in some cases it is rendered unmarketable.

The periodic dipping of the animals in a reliable sheep-dipping fluid will eradicate the parasites and prevent re-infestation.

One has only to inspect a flock which has been regularly dipped to appreciate the value of the operation, for the increased growth of wool and the improvement in the general condition of the animals is most marked.

The owner of even a moderately sized farm can recover the cost of the dipping plant within twelve to eighteen months from the enhanced returns that he will receive for his wool; the cost of dipping per head amounts to a very small sum.

Sheep dipped within a month from shearing can be dipped at a cost of two centavos per head, while a sheep bearing full fleece will cost at least

four centavos. The cost becomes double in the case of full-fleeced sheep as, of course, they carry away with them a much greater proportion of the dipping fluid.

There are a number of reliable dips on the market, the prices being more or less the same.

In the Sierra it has been found that some dips do not mix well with water drawn from the rivers, as the mineral salts therein form incompatible solutions and in this state are dangerous to use.

At the Granja, Macdougall's non-poisonous powder dip—supplied by the famous house of Messrs. Cooper, Macdougall and Robertson, Berkhamsted, England—has been found most satisfactory, as it is efficient and mixes well with river and spring water.

In a recent experiment conducted by Mr. G. A. H. Bedford, F.E.S., Research Officer, Onderstepoort, South Africa, to ascertain the effects of various dipping fluids upon the parasite of scab in sheep (*psoroptes scabei*), it was found that, while there was delayed action in the case of Macdougall's dip, it afforded protection to sheep for the maximum period—over fifteen days.

In this country the thick incrustations on the skin which characterise scab in other parts of the world are fortunately conspicuous by their absence, thus facilitating its eradication, for when incrustation exists the parasite is protected from the action of the dipping fluid.

For the destruction and eradication of "keds," or, as they are locally called, garrapatas, Macdougall's dip is infallible.

Construction of the Dipping Tank

Where stone is available, a very good dipping plant can be erected for under £p.200. This sum includes the construction of the bath itself, the well, swim of sixty feet, race out, dripping pens, collecting yard and mixing tank.

The old-fashioned walk-in race has been abolished and its place taken by a seven-foot-square well.

The walk-in race had the disadvantage of delaying operations by sheep accustomed to dipping refusing to advance, resulting in unnecessary forceful persuasion leading frequently to accident and damage.

In the new form of bath the sheep are lifted and put into the well by hand, and so simple and gentle is the operation that even ewes close to lambing can be dipped with impunity. With the help of a few Indians 1,000 head of sheep can be dipped per hour.

Shearing

This highly important operation in the scheme of wool production has already been discussed, and it is only necessary to explain that shearing by

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machinery has not been considered, in view of the cheapness and excellence of the work accomplished by the Indian in shearing with blades.

Classification of Wool

Few indigenous races possess the art of classifying wool to the extent held by the Indians of the Sierra; it is a natural instinct, and has been transmitted through centuries from family to family. The bleak conditions of the region in which they live has no doubt inculcated the value of the heat-retaining qualities of wool, and their constant association with flocks has taught them to recognise and differentiate the salient points of a fine or coarse wool.

According to some authorities the oldest records of the art of weaving come from Peru and Persia, and the selection of wool for their various fabrics made them, no doubt, experts in grading.

The progressive farmer in Peru, surrounded on every side by natural advantages which a bountiful Nature has bestowed, will find in sheep husbandry an enterprise worthy of his labours, and with improvement in his wool and convenient markets at his door for the disposal of his surplus stock, he might well be satisfied with his lot.

The Alpaca Industry

The Granja Modelo de Puno was primarily established in the interests of sheep breeding, but it has not failed to appreciate the commercial prospects of the alpaca industry, and no opportunity has been lost to bring the value of alpaca hair to the notice of the trade and by practical demonstration interest the public in the many uses to which this beautiful natural-coloured fibre can be put.

It is the result of the propaganda that accounts in great measure for the steady price realised for months past for the various grades of alpaca hair, and these firm prices are in marked contrast to the exceptional fluctuations in the price of sheep's wool.

Horses

In 1921 a small experiment in the breeding of horses was initiated by bringing a thoroughbred stallion and seven good class mares from England. The experiment from the very outset proved a failure, as the stallion promptly succumbed to Sierra conditions, and although three of the mares survived for a time they, too, died from either a rupture of one of the large pulmonary arteries or a rupture of the heart wall itself. Death, in consequence, was sudden in all cases and without premonitory symptoms, the animal dropping dead in the field or stable.

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Post-mortem examination revealed definite thinning of the walls of the heart and the large arteries, a peculiar lesion, due possibly to atmospheric pressure and diminished supply of oxygen inhibiting normal body metabolism.

The four remaining mares were sent to Arequipa, where, after a period of recuperation, they were sold and lived to do saddle work for some years in and around the city.

Cattle

Cattle, like horses, have a precarious existence in the high plateaux of the Andes, and unless introduced into those elevations when extremely young the chances of a successful issue are rare.

In all, five bulls—four Shorthorn and one Ayrshire—have been imported by the Granja Modelo, and of these the four Shorthorns have died. The Ayrshire, imported when but eight months old, has never been sick or sorry, nor has he been off the Sierra since the date of his importation. He has to his account a goodly bunch of excellent graded stock, and his life at stud is by no means at an end.

Three of the Shorthorn bulls, all young stock of eighteen months old, succumbed two to three months after their arrival in the Sierra, but the fourth, by transferring him to the lower altitude of Arequipa for rest and change after periods of work at the farm, lived until 1928, when he died from an acute attack of " brisket " disease.

" Brisket " Disease

This disease is the local name given by stock owners on the farms adjacent to the Central Railway to a disease affecting cattle, and the appellation takes its rise from the development of an œdematous swelling in the region of the breast bone.

What the true nature of the affection is has not, up to now, been ascertained, but it is certainly one in which the blood pressure is primarily involved and is associated with the residence of imported animals in high altitudes.

All breeds and ages of imported cattle—except the extremely young—are equally susceptible, and even the indigenous cattle born in the coastal zone suffer when taken to the Sierra highlands.

On the other hand, no case has been recorded among the Sierra breeds nor in the half-bred stock at the Granja.

Symptoms.—The disease manifests itself after the animal has been in the Sierra for a time; this time varies considerably—it may be a month or two or it may be as long delayed as two years. Its onset is characterised by general febrile symptoms, high temperature, quickened respiration, loss of appetite, suspension of rumination, grinding of the teeth and obstinate constipa-

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tion. As the disease progresses, more distinctive symptoms make their appearance, the chief among them being marked engorgement of the jugular veins on both sides of the neck, a jugular pulse, a laboured action of the heart out of all proportion to the temperature registered and the general condition of the animal; the eyes, owing to vascular congestion, become prominent, and have a peculiar staring appearance.

These primary symptoms are followed by those of pericarditis and pleurisy, accompanied by a large accumulation of serous fluid in the pericardial sack and thorax, and in the loose connective tissue of the dewlap—hence the name "brisket disease." The œdema of the dewlap reaches enormous proportions, even to the extent of impeding movement. The disease slowly progresses and the animal dies of heart failure.

The disease is a serious menace to cattle breeding in the highlands, and its further careful study must be undertaken.

There is no doubt that removal of the sick animal from the high altitude is essential if recovery is to be hoped for.

There are many sheltered areas with an average height of 12,500 feet above the sea where dairy farming is carried on with some measure of success, but generally speaking cattle do not thrive or reach their maximum development at these elevations.

Pigs

Contrary to all expectations, the large black pigs imported by the Granja did exceedingly well under Sierra conditions, but the cost of maintenance and feeding outweighed their utility and in consequence the animals were sent to the Granja Escuela of Cuzco, where grazing and feeding stuffs are more easily acquired.

Poultry

The rapidity with which the hot days are followed by freezing nights proved too severe for imported birds, and even under good housing conditions the wattles and combs of the Light Sussex, Leghorn and Buff Orpington became frostbitten and ulcerous.

The few eggs, which were irregularly laid, proved fertile, but they never reached maturity.

Since these early days cross-bred birds from the Cuzco district, many the offspring of our imported birds, have been tried with complete success.

The Veterinary Laboratory

When the health conditions of livestock in the highlands of Peru are compared with the bill of health of other countries, the absence of animal plagues or epizootics is remarkable and can only be attributed to the elevation

and general conditions of this region of the Andes, for stock raising, in all its branches, and free movement of animals have gone on without let or hindrance for centuries without the manifestation of serious outbreaks of animal disease.

Anyone with African experience finds in these vast tablelands an El Dorado for the prosecution of animal husbandry, and the health conditions afford a security to the stock farmer which few countries can offer.

Nevertheless there are problems of great economic importance to be solved before the various branches of the livestock industry can rest on a thoroughly sound foundation, and foremost among these are: lamb dysentery; a similar disease affecting young alpacas; elucidation of the peculiar phenomena manifested in "brisket" disease; methods for control and treatment of distomatosis of sheep; study of the local type of footrot; classification of the parasites of livestock, with special reference to the practical treatment of intestinal parasites of sheep; preparation of vaccine against blackquarter; investigation of the sporadic diseases which from time to time cause sickness and loss among livestock in general; and research into mineral deficiencies in the soil throughout Southern Peru and their relation to animal nutrition.

With this list of problems awaiting investigation and solution, the Government gave authority in 1928 for the appointment of a veterinary pathologist holding the necessary qualifications to undertake this most important work. In December, 1928, Mr. Harry Preston, M.R.C.V.S., D.V.S.M., was appointed to the responsible position. Mr. Preston had had wide experience in stock diseases as a research worker of the Animal Diseases Research Association of Scotland, and was specially versed in the diseases of sheep.

Mr. Preston arrived at the beginning of March, 1929, and the nucleus of a veterinary laboratory was immediately commenced.

As the work advanced, extensions to the laboratory have from time to time been made, and there are now stables for the horses required for the preparation of lamb dysentery serum, accommodation for cattle and sheep, and quarters for housing the hutches of the small experimental animals.

The equipment essential for a laboratory of general utility was brought from England, but additions and replacements have had to be made to meet the requirements of specific investigation.

The delay which has been occasioned in passing laboratory material through customs has not only impeded the work in hand but has, on several occasions, been the cause of disastrous effects in important research. It is to be hoped that some method will be devised to render impossible such delays in the future.

Lamb Dysentery.—Notwithstanding the many handicaps experienced in the erection of a laboratory at such a distance from centres of supply, and the fact that the pathologist is without the services of a trained assistant, the

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work accomplished has been excellent, and in the short time since its inception the laboratory has distributed 8,000 doses of lamb dysentery serum and has a reserve of 16,000 doses ready for the next lambing season.

The production of lamb dysentery serum within the space of a few months has only been made possible by the forethought of Mr. Preston in bringing with him from Scotland cultures of the bacillus—the causal organism of lamb dysentery.

In Scotland a disease prevails which is, to all intents and purposes, identical in symptoms, course of disease and lesions, to the disease of lambs with which we have to deal.

To confer immunity to the lamb through the mother is a method which may be devised in the near future, for the system has advantages which all sheepmen will appreciate, as it avoids the handling of very young lambs and prevents them from being tainted with the odour of disinfectants, causing estrangement from the mother.

The serum now issued by the laboratory is of high efficiency and is sold at the price of 25 cts. per dose, a price which enables every farmer to make use of it. In the past, serum imported from England has been in use, but the price of close on $1 per dose prohibited its use except in the treatment of the higher grades. A pamphlet on the dysentery of lambs has been issued in Spanish and distributed to sheep farmers.

Blackquarter.—Livestock owners in Peru have no doubt suffered losses from the disease known as "blackquarter"—carbuncle—as this disease is more or less ubiquitous throughout the Republic.

For many years a vaccine, made from the pathological lesions of affected animals, has been used with a certain amount of success, in the belief that the causal organism exerted some influence in conferring immunity.

The causal organism—the *Bacillus Chauvei*—exerts *no* influence in conferring immunity, and the success which has attended the old method of injecting powdered infected muscle prepared under laboratory conditions has been due to the presence of so-called "aggressins," which are the product formed during the active multiplication of the organism either in the animal tissue or in suitable artificial media.

The modern method of immunisation is to inoculate aggressins, artificially produced by growing the bacillus under special conditions in suitable media.

As the mortality from blackquarter must amount to a considerable percentage per annum, it behoves us to adopt this very efficient method of immunisation. It will be necessary to obtain some additions to the present laboratory equipment to undertake this important work, but as it is considered that the vaccine could be prepared here at the price of 10 cts. to 15 cts. per dose, the extra outlay entailed is insignificant.

Mineral Deficiencies.—During the past year a valuable experiment has

been carried out in regard to the deficiency of iodine in the soil. The experiment has been conducted over a duration of close on twelve months and as it is yet too soon to draw conclusions, the evidence collected points to a continuance of the experiment under modified conditions with administration of iodine in some form, either by direct administration or through the agency of licks.

Mineral deficiencies are being studied all over the world, and Rowatt Institute, Aberdeen, has been very prominent in this line of research.

Samples of soil from various districts of the Sierra pasturelands have been sent to Dr. Orr, Director of the Institute, and the results of his analyses are eagerly awaited, for, apart from any iodine deficiency which may exist, it may be discovered that the composition of our local soils is deficient of phosphate and lime salts.

Dysentery in Young Alpacas.—The dysentery in the young of alpacas is a matter of paramount importance, and its investigation calls for immediate action.

It may be proved that this disease is analagous to the dysentery of lambs, in which case a serum for its suppression may be found along parallel lines of research.

If a serum comparable to the efficient serum for lambs now in use can be evolved, the diminishing birthrate in alpaca and its species will be checked, and a considerable augmentation to its population assured.

Mange (acariasis).—Among the llama and its kind there exists a virulent form of mange due to invasion of the skin by the parasite of sarcoptic mange —*sarcoptes scabei.*

The disease is not apparently actively contagious, due in a measure to the fact that usually an abundant and long fleece falls like a protecting mantle over the affected parts, preserving adjacent animals from contact even when closely kraaled.

In advanced cases the ravages of the parasite are both extensive and deep, and the resultant scab may become one inch to one and a half inches in thickness, a condition which requires constant and prolonged treatment.

The disease is being closely studied and already there are signs of its responding to a specific line of dressing. Fortunately, the Andean camels do not possess the greasy yolk so characteristic of the fleece of the sheep, and which so often impedes the action of anti-parasitic applications.

Alpaca Disease.—There is a mysterious disease among alpacas of which nothing is known in regard to its etiology, and the reports received are so divergent in character that it is quite impossible to arrive at any conclusions. From details recorded it would appear as if there were two diseases, one which—*per se*—is not actually fatal, and a second which supervenes, affects full-grown animals and accounts for a mortality of close on 100 per cent.

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It may be that the first is but the premonitory symptoms of the fatal form, but until a case comes under scientific observation no further progress is possible. There is no gainsaying the fact that the visitation of a peculiarly fatal disease does occur, devastating herds of alpaca in a short space of time, but the true nature of the disease will not be ascertained until facilities are given for its scientific investigation.

These three diseases of the alpaca—i.e., dysentery in the young, mange and "alpaca disease"—all await thorough study, a study which requires the willing co-operation of the owners of alpaca herds. The veterinary pathologist has everything in readiness to undertake immediate research into these diseases, and as his investigations may lead to a complete elucidation of them and how best to combat them, will alpaca breeders co-operate by sending to the laboratory: pregnant animals so that the efficacy of the serum for dysentery may be tested on the young; animals suffering from mange so that they may be submitted to treatment; and, lastly, will farmers notify the laboratory of any manifestation of fatal disease among their herds, so that field investigation can be at once undertaken and fresh cases of the disease placed under observation?

Research into these three diseases represents so much to the breeders themselves, to the alpaca industry and to the Republic, that a ready response to this appeal is very earnestly solicited.

To co-operate in this important matter will not entail any expense on the part of the farmer, and the transport of sick animals by train to Chuquibambilla Station has been very kindly arranged by the general manager of the Southern Railways.

I would again strongly advocate the appointment of a trained assistant for the laboratory. The preparation of media, the constant vigilance that cultures and incubators entail, the general routine relating to a laboratory and the supervision of the native staff are *his* duties, and should not occupy the time nor interrupt the highly technical work which devolves upon the pathologist.

Pasturelands

The principal grasses of the extensive pasturelands of the Andean plateau are: grama (*Distichlis sp. prima*), quigua (*Sporobolus fastigiatus*) and chilligua chica (*Muhlenbergia peruviana*). The names of the grasses are given in the quechua vernacular, and within parentheses their botanical classification.

These indigenous grasses are highly nutritious and afford excellent feed for all classes of livestock. During the dry season of the year the grasses resort to desiccation and lie dormant until the advent of the rains. In other words, the grasses for six months of the year form a "standing hay," and

the rapid conditioning of sheep is evidence of the nutritive value of the grasses in their dry state.

The absence of burrs, grass seeds, noxious weeds, etc., throughout the pasturelands is remarkable, and although various experiments have been carried out with imported varieties and mixtures of the best types of British fodder grasses, these experiments demonstrate that imported grasses will never challenge the supremacy of the indigenous varieties, either for hardiness, nutrient qualities or absence of baneful elements. The pasturelands, under fenced conditions, will maintain two sheep to the hectare per annum.

The seeds received from the famous house of Sutton, of Reading, have given gratifying results, and two areas of permanent pasture have been laid down. The areas will be used for the making of hay and supplying a change in dietary to sick or weakly animals.

The Quechua Indian

This review of the work of the Granja Modelo de Puno would be incomplete without reference to the Indian of the Sierra. No one who has worked alongside of the Indian can have failed to recognise his value; he is one of the Republic's greatest assets and all right-thinking men agree that his education and advancement should receive the earnest attention they demand.

The Indians employed on the Granja have made constant application for a school in which their children can receive some elementary instruction, and as the airy and well-lit woolshed is only used a portion of each year, it is proposed to fix up in it a small school for the children, appoint a native teacher, and thus fulfil this very natural desire on the part of the Indians for preferment.

Conclusion

A perusal of the preceding pages will have given the reader an outline of the Granja's activities since its establishment nine years ago. It is a record of work accomplished which will, it is hoped, serve to advance the sheep and wool industry another step along the road of progress. Mistakes have been made and failures recorded, but it is by these very mistakes and failures that the Granja fulfils a useful purpose, for by its errors others learn.

The Granja Modelo de Puno, with its 11,000 head of graded stock, its fenced-in grazing grounds, its well-appointed homestead, an up-to-date woolshed and veterinary laboratory, stands to-day as a national asset of no mean value, but a State experimental farm can never be viewed as a commercial enterprise, nor can its indirect value to the future welfare of the Republic be estimated in pounds Peruvian; still, it is reasonable to assume that in years to come, when the farm is in a position to meet the demands of the region for pure-bred stud stock, this institution might well become self-support-

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ing; to ensure this, however, the purchase of the farmlands is essential, to remove the financial millstone which their heavy rentals now impose.

The Granja has been glad to extend the heartiest of welcomes to the numerous visitors—many from far distant parts of the world—who have come to see for themselves what President Leguia and his progressive Government are doing to develop the vast potentialities of Southern Peru.

In drawing this report to a close, the Director of the Institution takes this opportunity of thanking the many farmers who have visited the Granja and by friendly and constructive criticism have done much to assist in its advancement; to the general manager of the Southern Railways—Mr. L. S. Blaisdell—and his staff, all thanks are due for their many kind offices which they have discharged for the benefit of the Institution; and to the members of the Granja staff the Director extends his warm thanks and sincere appreciation for their loyal and zealous co-operation during times of hard work and anxiety in the high Sierra—services whose excellence have brought the Granja Modelo de Puno to a state of progress and usefulness worthy of emulation.

Clinical Articles

A MILK FEVER COMPLICATION

By R. HUDSON, F.R.C.V.S.
Retford

The subject was a fourth calver in good condition, a good milker, and went down the day following calving.

The symptoms were of the mild type; the animal was not unconscious, food was refused, and she lay placing her head to her side, but could hold it up when disturbed.

Calcium Chloride	1 ounce
Magnesium Chloride	3 drams
Water	30 ounces

was injected intravenously. Seen the next day, the cow was better in that the head symptoms had passed, but she failed to rise when tried, and she would not feed.

The calcium injection was repeated, and as she was in a narrow stall and cramped for room, I advised the owner to remove the two other cows and let her have their places, which was a wide double standing. On visiting the day following, I found her feeding but still unable to get up, though making occasional efforts to do so. I had her turned over and examined her limbs for injuries, but found nothing except a slight increase about one hock joint, which might have followed bruising on the floor.

A day or two later I found a hard swelling in the thigh following the semi-membranosus muscle.

She was helped up by pulley, but could only stand with support, being unable to extend the fetlock joint. Nothing was observable about the fetlock.

The swelling in the thigh was rubbed with mustard daily. Soda salicylate and Ammon. carb. ȧȧ℥fs was administered twice daily.

In about a week she was able to rise without help, but stood on the fetlock joint. The thigh swelling was subsiding, and I had hopes that when she regained the ability to extend the fetlock joint she would soon be all right.

But it was not to be. There developed a moist foul-smelling condition in the interdigital cleft, with formation of necrotic tissue. At the margin of the hoof a discharge had started, hardly detectable, but enough to arouse suspicion that the hoof was going to slough off. I tried the foot all round and found it insensible to pricks from hoof to fetlock. The foot was dead and would probably slough off at the fetlock.

She was sent for slaughter, but as the carcase went out of the district I could not make a *post-mortem* examination.

Remarks

I might have slaughtered the animal earlier, but with one quarter condemned and possibly the whole carcase. There was not much to gain, and she was a good milch cow, with prospects, if I could get her better.

The origin of the condition in the thigh is obscure.

It may be due to cramp when lying in the stall where room is limited, and turning them is difficult. It may be due to obstruction and inflammation in some large vein or lymphatic.

Usually it leads to the breaking up of muscle tissue.

Such cases are a warning that we should not allow milk fever cases to lie in one position longer than about four hours. Whatever the treatment may be, they do not all get up in a few hours; so that efforts should be made to see that the circulation in the limbs is not impeded.

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TUBERCULIN REACTIONS

By W. P. BLOUNT, F.R.C.V.S.,

Chief Veterinary Officer to the East Sussex County Council, Lewes

To many practitioners, the double intradermal bovine tuberculin test has become a standardised routine and except for the low percentage of doubtful reactors which occasionally crop up, the method appears satisfactory. On the other hand, others feel less sure of themselves, and find some confusion in interpreting reactions which are relatively large yet firm, painless and non-œdematous. Are they to conform to the school which says *any* reaction at the 72nd hour which shows an increase of four or more millimetres above the initial measurement must be considered positive, or shall they discard measurements altogether and rely on the character of the reaction?

In a previous paper dealing with intradermal tuberculin testing in pigs, the writer recorded that, in his experience, injection of tuberculin into the skin at the side of the vulva was superior to the usual site behind the ears. Although the results with avian tuberculin on one side and synthetic (Cambridge-London) bovine tuberculin into the opposite lip of the vulva are satisfactory, experience has shown that a new potent tuberculin (synthetic) of Bayer Products gives results even better.

A preliminary test using this same bovine synthetic tuberculin (Bayer) on cattle suggests that it is either extremely potent and far superior to the usual brand of synthetic tuberculin employed in this country, or alternatively it is liable to give results which are absolutely false. Since tuberculin testing plays such an essential part in the life of the country practitioner at the moment, it is to be hoped those in a position to check the value of the new synthetic (bovine) Bayer product will do so.

Fourteen dairy cows in a hitherto untested herd were subjected to the double intradermal synthetic bovine tuberculin test, contrasting the results obtained using the Cambridge-London brand versus the new Bayer product. Both tuberculins were used simultaneously on the same side of the neck, the injection sites being separated by at least 12 inches.

At the 48th hour the results were as follows:—

Cambridge-London: 12 pass. 2 failures.
Bayer: 3 pass. 9 failures. 2 doubtful reactors.

At the 72nd hour the discrepancies were even greater:—

Cambridge-London: 6 pass. 6 fail. 2 doubtfuls (? failures).
Bayer: 1 pass. 12 fail. 1 doubtful (? failure).

The two products were also tested on two known negatively reacting bulls, and although it is extremely unfortunate more "controls" were not available at the time, the results were identical, indeed, if anything, the Bayer product showed slightly less "negative reaction," thus:—

Bull RD	—Cambridge:	9.5	11.5	12.0	P. Painless, nodular, circumscribed.
	Bayer:	10.5	11.5	11.5	P. Painless, nodular, circumscribed.
Bull DRN	—Cambridge:	11.5	13.0	14	P. Painless, nodular, circumscribed.
	Bayer:	11.5	13.5	13.5	P. Painless, nodular, circumscribed.

As a further proof of the superiority of the Bayer tuberculin, a glance at the average readings of the 14 tested cattle shows the following rather striking figures:—

	Initial measurements	*48th hour*	*72nd hour*
Cambridge-London ...	7.1	9.5	12.8
Bayer	6.9	12.6	17.7

It will be seen that although the initial measurements in both series of injections were practically identical, the reactions with the Bayer product (on the average) appeared on the 48th hour to equal those of the 72nd hour when using ordinary synthetic tuberculin.

Whereas only three of the former groups showed œdematous reactions, 11 of the animals injected with the Bayer tuberculin showed appreciable œdema. The full results are as follows:—

Cambridge		*1st*	*2nd*	*3rd*	*Result*	*Remarks*
White	13	6.2	7.2	10.5	? (F.)	Nodular, painless and circumscribed.
	12	8.9	9.0	11.2	? (F.)	Some pain. Some œdema.
	11	6.2	7.5	9.5	P.	Painless and nodular.
	10	7.0	8.5	9.5	P.	„ „ „
	9	7.0	8.2	9.0	P.	„ „ „
	8	7.1	9.6	9.6	P.	„ „ „
Bottom	1	9.0	10.5	13.8	F.	Œdematous.
	2	5.4	7.2	19.0	F.	Firm, plaque, some pain.
	3	6.2	13.5	18.0	F.	Painful.
	4	6.9	9.5	15.0	F.	Firm. Painful.
	5	8.5	11.5	15.0	F.	Painless.
	6	6.9	7.2	9.0	P.	Nodular.
	7	6.5	8.0	9.5	P.	„
	8	7.1	15.6	21.0	F.	Firm and painful.

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Bayer		*1st*	*2nd*	*3rd*	*Result*	*Remarks*
White	13	6.5	11.5	17.2	F.	Hot. Non-painful. Some œdema.
	12	9.2	17.0	24.8	F.	Very painful. Œdema.
	11	6.6	13.5	17.5	F.	Subcutis œdema. No pain.
	10	6.9	15.0	18.5	F.	„ „ Some pain.
	9	6.2	11.0	18.0	F.	„ „ Slight pain.
	8	7.1	16.5	21.0	F.	Œdematous. Painful.
Bottom	1	7.5	11.0	12.0	F.	Some œdema. No pain.
	2	5.0	8.0	20.0	F.	Subcutis œdema. Slight pain
	3	6.2	13.5	17.0	F.	Œdematous. Painful.
	4	6.9	12.5	21.0	F.	„ „
	5	8.3	14.2	18.5	F.	„ „
	6	6.5	7.8	10.0	P.	Painless and nodular.
	7	6.1	9.2	12.0	? (F.)	Nodular. No pain.
	8	7.1	16.6	21.0	F.	Plaque. No pain and no œdema.

Abstracts

TRICHOMONIASIS OF PIGEONS

By H. SPORRI,
Schweizer Archiv f. Tierheilkde

April, 1938.

THIS disease is prevalent among pigeons in both temperate and tropical zones and the author describes a case that occurred in Switzerland.

It affected only young pigeons three to six months old. The birds do not eat, remain two or three days with ruffled feathers, drooping wings, squatting together and die.

The pathological-anatomic appearances show a great similarity to "black-head," viz., necrotic inflammatory patches in the liver. There are two predilection seats of the trichomonads, in the larynx and crop, and in the liver.

Transmissions.—Trichomonads are often found in the mucus of the mouth of clinically healthy pigeons. These birds are the dangerous transmitters and spreaders of the disease. In feeding the flagellates will be carried in the crop milk to the young by the parents.

The trichomonads bore their way through the tender and little resistant structure of the digestive apparatus into the blood stream and are carried thence to all parts of the body. They wander into the liver through the

FIG. 1. SHOWS THE GREATLY INCREASED SIZE OF THE LIVER AND THE CONCENTRIC NECROTIC PATCHES

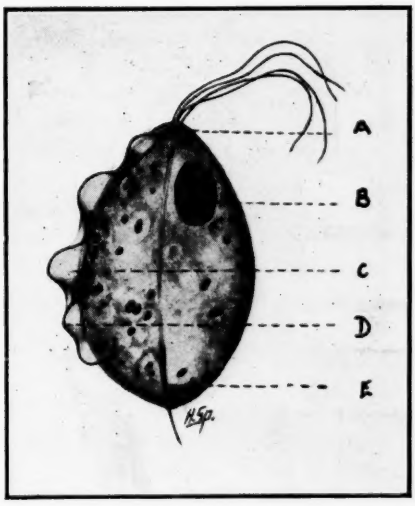

FIG. 2. TRICHOMANAS HEPATICA (RIVOLTA 1878).

A. Flagellum.
B. Basal Nucleus.
C. Nucleus.
D. Undulating Membrane.
E. Edge flagellum.
F. Axlerod.

ARTICLE BY H. SPORRI. PAGE 256.

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bile duct. They also get into the drinking water and may live there for a long time and it is important to remember this in checking the disease.

Therapy.—As good disinfection measures copper sulphate and sublimate may be used. One per cent. antimony tartrate has also been used.

Copper sulphate 0.5 per cent. in the drinking water or 0.5 per cent. sublimate in the drinking water.

Further cases of death were stopped by these medicines when combined with thorough cleansing and disinfection of the cote and nest boxes. The trichomonads could easily be bred in Locke-egg-serum, but not in liver or serum bouillon.

FUR FARMING

Fur farming in Canada continues to expand. The revenues of the fur farms of the Dominion showed an increase of 18 per cent. in 1936, the latest year for which returns are available. This industry, which began in Prince Edward Island two score or more years ago, has now spread over the whole Dominion. In the last twenty years the growth has been phenomenal. The number of fur farms in Canada in 1919 was only 429, while in 1936 it had risen to 8,140. The silver fox is still the mainstay of the industry, but the mink is becoming of increasing importance. In the period since 1919, when the collection of systematic statistics for the industry began, the number of silver foxes on Canadian fur farms has risen from 7,181 to 151,696. The number of mink on the farms in 1927 was only 2,615, but by 1936 it had risen to 44,631. Fur farms now provide about 40 per cent. of the total value of the raw fur production of Canada.

The number of fox farms in Canada rose from 6,632 in 1935 to 7,057 in 1936, according to a report just issued by the Dominion Bureau of Statistics. Between the same years the number of other fur farms increased from 863 to 1,083. The revenue of the fur farms increased, on the same comparison, from $5,520,400 to $6,537,500. The number of fur bearers born on the farms in 1936 was 296,357 as compared with 245,528 in 1935; the number of animals sold rose from 14,526 to 21,385; and the number of fur bearers on the farms increased from 202,363 at the end of 1935 to 221,015 at the end of 1936. The total value of fur farm property—including lands, buildings and fur-bearing animals—increased from $15,972,000 in 1935 to $16,932,000 in 1936.

The silver fox and the mink are outstanding in their contribution to all phases of fur farming. The number of silver fox born on the fur farms

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increased from 184,988 in 1935 to 221,905 in 1936; the number of mink born rose from 48,961 to 65,769. The number of silver foxes sold alive off the farms rose from 9,901 to 9,976 and the number of mink sold from 3,574 to 10,452. The number of silver fox pelts sold increased from 129,001 to 162,999 and the number of mink pelts sold from 30,558 to 40,818. The revenue from the sale of silver foxes sold declined from $562,480 to $542,888; while the revenue from the sale of live mink increased from $73,402 to $271,225. The revenue from the sale of silver fox pelts increased from $4,437,300 to $4,950,200; and the revenue from the sale of mink pelts from $323,200 to $652,400. Total revenue from the sale of live fur-bearers from the farms advanced from $649,400 in 1935 to $829,500 in 1936; while the total revenue from the sale of pelts rose from $4,870,900 to $5,707,900. Silver fox and mink together accounted for 98 per cent. of the total revenue from the sale of pelts from the fur farms in 1936.

—*Agricultural and Industrial Progress in Canada*, April, 1938.

Reviews

The Diary of a Surgeon in the Year 1751-1752, by John Knyveton. Edited by ERNEST GRAY (Appleton-Century Co., 10s. 6d.), New York and London, pp. 322. Illustrated with numerous old plates.

A most remarkable book, and dealt with in a most fascinating and interesting fashion. John Knyveton, whose biography is here depicted, was a live personality in the 18th century, and the Veterinary Profession of the present generation can with pride point to one of its members as the compiler of this fascinating diary; for Mr. Ernest Gray owes his inside knowledge to this fact.

John Knyveton lived in an age when surgery, and indeed medicine too, was very primitive, and in the days when the anatomical subjects were largely obtained by "body snatching." As he lived to the ripe age of 80, it can readily be understood that his career led him through many eventful experiences, not the least of which were those when acting as a Naval Surgeon. It is the kind of book which one can pick up at any time and open at any page, the only fault being that a professional man would be very unwilling to put it down again until he had finished its pages. The ideas therein in regard to such organs as the Pineal gland, together with the theories of the actions of remedies, and the quaintness of the prescriptions, which are written down in full, make one ponder upon the progress which medicine has made since the time when this diary was written.

It is a book which will certainly find its way into every library in the kingdom, and it will give delight to every man of medicine whether he belongs to the Medical or the Veterinary branch.

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ILLUSTRATION REFERRED TO IN CORRESPONDENCE BY WM. COLLINSON, M.R.C.V.S., ON PAGE 260

Investigations on the Course of Distribution of the Nerves Supplying Levator Anguli Scapuli and Rhomboidœus Muscles; and the Formation of the Phrenic Nerve, in the Ox; with Observations on Certain Anatomical Deviations, by H. N. CHELVA AYYANGAR, G.M.V.C., Lecturer in Anatomy, Madras Veterinary College. Publishers: Delhi Imperial Council Agricultural Research, India, price 7s. 9d., pp. 60 with 57 plates.

This book is a compilation of observations made by an expert anatomist on the nerves supplying the region mentioned in the title, in the ox, and its deviations as discovered in a number of specimens in the dissection room. They are given in meticulate detail and display an amount of patience and intimate knowledge on the part of the author which only an expert can hope to possess. Reports upon the results of dissections of this kind, if the region is one upon which operative interference is common, are of great value to the surgeon; and a little brochure on these lines would be of great value not only to the student but also to the clinician, who is so often called upon to perform the ordinary operations pertaining to one's daily routine when engaged (whether in Government service or private practice) upon work amongst stock.

The Young Riders' Picture Book, by "Golden Gorse." Published by Country Life, Ltd., London, 7s. 6d. net, pp. 144, with 185 photographs.

To attempt to describe "The Young Riders' Picture Book" would be almost to attempt to "paint the lily," for, as a book of instruction to the youngster whose parents or guardians desire for him (or her) correct poise and balance in the saddle, its pictures (which are actual photographs) form a method of instruction which the brain of a child will grasp at once, "Golden Gorse"—the nom-de-plume under which the author hides his or her) identity—has shown wonderful judgment in the selection of theme, but when one finds that they are supplemented by a simple, but very effectively written, series of brief chapters—written in language which is equally understandable by children as by "grown-ups"—under such headings as "Choosing a Pony," "How to Get a Good Seat," "Hands," "The Pony Club; Gymkhanas, etc.," "Shows," "Jumping," "Hunting," and a dissertation on the different breeds of horses and ponies, those who read this, if they have children, or friends with children, should purchase half a dozen copies now, in readiness for birthday presents; and even if kept until the Christmas present season the investment will be a good one.

It is a book which should be on the bookshelf of every member of each of those useful Societies—the Institute of the Horse and the National Horse Association—whose Council and officials work so hard on behalf of that much beloved friend and useful servant of man—the horse.

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Correspondence

Dear Sir,

I was very interested to read article on Hoose in Lambs in the April number of VETERINARY JOURNAL, by Mr. Hall Masheter.

I have been using "Intertracheal" injection for same for past 40 years with very good results and inject up to 3 c.c. in big Lincolns.

To obviate backaches I have the sheep held as in photograph enclosed as I find there is not so much bending and one has more control of the animal. The assistant should sit on a chair or fairly high box.

Have solution in a cup and spare needles on box or bin close to where assistant is sitting. If the sheep are all in a confined space, I find you can do them as quickly as one man can catch and bring them to you.

If needles are rubbed up to a lancet point on an oil stone I find they do not blunt so quickly. Wire should be kept handy as one often gets a plug of cartilage in the needle and cannot dislodge it by pressure on the piston.

Yours faithfully,

WM. COLLINSON, M.R.C.V.S.

Personal

PROFESSOR THOMAS DALLING, M.A., M.R.C.V.S., has been unanimously elected as President of the Comparative Section of the Royal Society of Medicine for the forthcoming session.

THE congratulations of the profession will be given to Mr. Wm. Walker Henderson, M.R.C.V.S., D.V.S.M., Director of Veterinary Services in Nigeria, who received a C.B.E., and to Mr. Arthur W. Turner, D.Sc., D.V.Sc., Senior Bacteriologist, Animal Health Division, Commonwealth of Australia, who is awarded an O.B.E.

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